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09/266,012	03/11/1999	YUKIO YAMAUCHI	0756-1947	5203

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EXAMINER

RICHARDS, N DREW

ART UNIT

PAPER NUMBER

2815

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/266,012

Applicant(s)

YAMAUCHI ET AL.

Examiner

N. Drew Richards

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 6-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6-8 and 13 is/are allowed.
- 6) ☒ Claim(s) 1-3, 9-11 and 15-19 is/are rejected.
- 7) ☒ Claim(s) 12, 14, 20 and 21 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 08/617,121.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 25.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claim 19 is rejected under 35 U.S.C. 102(e) as being anticipated by Tang et al. (U.S. Patent No. 5,550,066).

Tang et al. disclose in figures 1-9 and on columns 1-14 an organic electroluminescent display device. Specifically Tang et al. disclose a pixel array (figure 1) of an organic electroluminescent device provided on an insulating substrate 41 (figure 3), an island (polysilicon island as labeled in figure 4) having a polycrystalline silicon (polysilicon as labeled in figure 4) semiconductor formed thereon in a predetermined pattern provided on the substrate, and a thin film transistor (n+ source and drain with i channel and gate 44 as shown in figure 3) formed in the island. The claimed thin film transistor is interpreted consistent with the disclosure of the instant application. That is, each pixel block consists of two transistors readable as a thin film transistor, see figure 4. Figure 4 of the present invention shows a thin film transistor as two transistors 404<sub>x</sub> and 405<sub>x</sub> in each pixel block. Hence, Tang et al. is interpreted

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likewise as disclosing a single pixel block with two transistors readable as a single thin film transistor as seen in figures 1 and 2. The thin film transistor of Tang et al. is used as a pixel driving device and a peripheral driving circuit device. TFT2 (figure 2) is considered to be a pixel driving device as it controls the electroluminescent device while TFT1 (figure 2) is considered a peripheral driving circuit device as it is on a peripheral of the TFT2 and EL PAD and supplies driving power to the TFT2.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Moeller et al. (U.S. Patent No. 4,511,756).

Applicant's admitted prior art teaches on page 1 line 8 through page 2 line 4 an electroluminescence display device. The admitted prior art device comprises a thin film transistor formed over a substrate having an active layer of silicon including a source, drain, and channel region. The admitted prior art does not explicitly state that it is formed on a substrate having an insulated surface, however it is well known to one of ordinary skill in the art at the time of the invention to form thin film transistors on insulating substrates. The admitted prior art also teaches an electrode comprising aluminum electrically connected to one of the source and drain regions having a barrier

metal interposed between the electrode and the source or drain region to prevent a direct contact therebetween. The admitted prior art also teaches a transparent electrode electrically connected to the thin film transistor and an organic electroluminescence layer adjacent to the transparent electrode. The admitted prior art does not teach forming a barrier metal of titanium.

Moeller et al. teach a method of forming aluminum on silicon. Moeller et al. teach a barrier metal layer between the aluminum and the silicon. Moeller et al. teach on line 4 of the abstract using a barrier metal comprising titanium. With respect to claim 3, Moeller et al. teach that the barrier metal contains nitrogen.

Applicant's admitted prior art and Moeller et al. are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a barrier metal of titanium nitride between the silicon source or drain and the aluminum electrode. The motivation for doing so is prevent diffusion of aluminum into the silicon source or drain region. Therefore, it would have been obvious to combine Applicant's admitted prior art with Moeller et al. to obtain the invention of claims 1 and 3.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art with Moeller et al. (U.S. Patent No. 4,511,756) as applied to claim 1 above, further in view of Tang et al. (U.S. Patent No. 5,550,066).

Applicant's admitted prior art with Moeller et al. teach forming a transparent electrode but do not disclose forming it of indium tin oxide. Tang et al. teach an organic

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EL display device which has an indium tin oxide transparent electrode. Tang et al. and Applicant's admitted prior art are from the same field of endeavor. It would have been obvious to one of ordinary skill in the art at the time of the invention to use an indium tin oxide electrode as indium tin oxide (commonly referred to as ITO) is a well known and long established transparent conductor. Therefore, it would have been obvious to combine Applicant's admitted prior art and Moeller et al. with Tang et al. to obtain the invention of claim 2.

6. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. with Applicant's admitted prior art, and further in view of Moeller et al. (U.S. Patent No. 4,511,756).

With regards to claim 9, Tang et al. teach a device having a substrate with an insulating surface, a thin film transistor having an active layer comprising crystalline silicon including source, drain and channel regions, a transparent electrode electrically connected to the thin film transistor, an electroluminescence layer comprising an organic material adjacent to the transparent electrode, and a peripheral driving circuit comprising another thin film transistor formed over the substrate. Tang et al. do not teach an electrode comprising aluminum electrically connected to one of the source and drain regions and a barrier metal layer interposed between the electrode and the one of the source and drain regions to prevent a direct contact therebetween. This is taught by Applicant's admitted prior art to allow low resistance electrical communication with a diffusion barrier to prevent silicon diffusing from the active layer to the electrode.

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Neither Tang et al. nor Applicant's admitted prior art teach that the conductive layer comprises titanium. Moeller et al. teach using a titanium barrier as discussed above with regards to claims 1 and 3. At the time of the invention it would have been obvious to use the barrier layer of Moeller et al. to prevent diffusion of aluminum into the silicon source or drain region.

7. Claims 10, 11 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tang et al. (U.S. Patent No. 5,550,066) in view of Takemura (U.S. Patent No. 5,828,429).

Tang et al. disclose an electroluminescence display device on columns 1-14 and in figures 1-9. More specifically, Tang et al. disclose a substrate 41 having an insulating surface, at least one X-direction signal line over the substrate and at least one Y-direction signal line crossing the X-direction signal line as seen in figure 1, a thin film transistor formed over the substrate at an intersection of the X-direction and Y-direction signal lines having an active layer comprising crystalline silicon including source, drain, and channel regions, a transparent electrode (anode electrode), and an organic electroluminescence layer 82 adjacent to the transparent electrode. The structure of the organic electroluminescence display device can be seen in figure 8. Tang et al. do not explicitly disclose a peripheral driving circuit comprising another thin film transistor formed over the substrate for supplying a signal to one of the X-direction or Y-direction signal lines. Takemura teach an electroluminescent display device having a peripheral driving circuit comprising a thin film transistor formed over the substrate for supplying a

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signal to one of the X-direction and Y-direction signal lines in column 16 lines 48-52 where the thin film transistor has an active layer comprising crystalline silicon.

With regard to claim 11, the thin film transistor and another thin film transistor being manufactured through the same process is a product-by-process limitation that does not structurally distinguish over the prior art.

Tang et al. and Takemura are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a second thin film transistor in a peripheral driving circuit for supplying a signal to the X-direction or Y-direction signal lines. The motivation for doing so is to allow controllable selection and switching on and off of the electroluminescent devices in each pixel to display a variety of images. Therefore, it would have been obvious to combine Tang et al. with Takemura to obtain the invention of claims 10 and 11.

With regard to claim 15, Tang et al. disclose an electroluminescence display device including a substrate 41 having an insulating surface, at least one X-direction signal line over the substrate and at least one Y-direction signal line crossing the X-direction signal line as seen in figure 1, at least one pixel defined at an intersection between the X-direction and Y-direction signal lines, at least one switching thin film transistor and one current control thin film transistor formed over the substrate in the pixel, and organic electroluminescence layer 82 over the substrate. Tang et al. do not explicitly disclose a peripheral driving circuit comprising at least a third thin film transistor formed over the substrate for supplying a signal to one of the X-direction or Y-



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direction signal lines. Takemura teach an electroluminescent display device having a peripheral driving circuit comprising a third thin film transistor formed over the substrate for supplying a signal to one of the X-direction and Y-direction signal lines in column 16 lines 48-52. Tang et al. further teach the transistors comprising a semiconductor layer comprising crystalline silicon and including source, drain and channel regions, a gate insulating film adjacent to the semiconductor layer and a gate electrode adjacent the gate insulating film. One of ordinary skill in the art would recognize that the in the combination the third transistor would be formed with a similar structure as the switching and current control transistors. With regard to claim 16, the gate electrode can be seen over the channel region with the gate insulating film interposed therebetween.

Tang et al. and Takemura are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a third thin film transistor in a peripheral driving circuit for supplying a signal to the X-direction or Y-direction signal lines. The motivation for doing so is to allow controllable selection and switching on and off of the electroluminescent devices in each pixel to display a variety of images. Therefore, it would have been obvious to combine Tang et al. with Takemura to obtain the invention of claims 15 and 16.

With regard to claim 17, Tang et al. disclose an organic electroluminescence display device including a substrate 41 having an insulating surface, at least one X-direction signal line over the substrate and at least one Y-direction signal line crossing the X-direction signal line as seen in figure 1, at least one pixel defined at an

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intersection between the X-direction and Y-direction signal lines, at least one switching thin film transistor and one current control thin film transistor formed over the substrate in the pixel, and organic electroluminescence layer 82 over the substrate. Tang et al. do not explicitly disclose a peripheral driving circuit comprising at least a third thin film transistor formed over the substrate for supplying a signal to one of the X-direction or Y-direction signal lines. Takemura teach an electroluminescent display device having a peripheral driving circuit comprising a third thin film transistor formed over the substrate for supplying a signal to one of the X-direction and Y-direction signal lines in column 16 lines 48-52. Tang et al. further teach the transistors comprising a semiconductor layer comprising crystalline silicon and including source, drain and channel regions, a gate insulating film adjacent to the semiconductor layer and a gate electrode adjacent the gate insulating film. One of ordinary skill in the art would recognize that the in the combination the third transistor would be formed with a similar structure as the switching and current control transistors. The limitation of the transistors being manufactured through the same process is a product-by-process limitation that does not structurally distinguish over the prior art. With regard to claim 18, the gate electrode can be seen over the channel region with the gate insulating film interposed therebetween.

Tang et al. and Takemura are combinable because they are from the same field of endeavor. At the time of the invention it would have been obvious to a person of ordinary skill in the art to provide a third thin film transistor in a peripheral driving circuit for supplying a signal to the X-direction or Y-direction signal lines. The motivation for doing so is to allow controllable selection and switching on and off of the

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electroluminescent devices in each pixel to display a variety of images. Therefore, it would have been obvious to combine Tang et al. with Takemura to obtain the invention of claims 17 and 18.

### ***Request For Interference***

8. Claim 19 of this application has been copied by the applicant from U. S. Patent No. 6,147,451. This claim is not patentable to the applicant because claim 19 is properly rejected under 35 U.S.C. 102(e) as being unpatentable over Tang et al. (U.S. Patent No. 5,550,066)

An interference cannot be initiated since a prerequisite for interference under 37 CFR 1.606 is that the claim be patentable to the applicant subject to a judgement in the interference.

9. Claims 10 and 11 of this application are asserted by applicant to correspond to claim(s) of U.S. Patent No. 6,147,451.

The examiner does not consider this claim to be directed to the same invention as that of U.S. Patent No. 6,147,451 because claims 10 and 11 do not contain the limitations of an island of a polycrystalline silicon formed thereon in a predetermined pattern. Accordingly, an interference cannot be initiated based upon this claim.

10. Claim 19 is rejected under 35 U.S.C. 135(b) as not being made prior to one year from the date on which U.S. Patent No. 6,147,451 was granted. See *In re McGrew*, 120

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F.3d 1236, 1238, 43 USPQ2d 1632,1635 (Fed. Cir. 1997) where the Court held that the application of 35 U.S.C. 135(b) is not limited to *inter partes* interference proceedings, but may be used as a basis for *ex parte* rejections.

### ***Allowable Subject Matter***

11. Claims 6-8, 12-14 are allowed.

12. Claims 12, 14, 20 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Response to Arguments***

13. Applicant's arguments filed 7/29/02 have been fully considered but they are not persuasive.

With regard to claim 19, Applicant argues that Tang fails to disclose a "peripheral driving circuit" as recited in claim 19. Applicant argues that the Examiner's construction of the term "peripheral driving circuit" is inappropriate and incorrect. This is not persuasive as the first and second transistor of Tang et al. (TFT1 and TFT2) have been interpreted consistent with the transistors shown in figure 4 of the instant application. Figure 4 of the instant application shows first and second transistors (404 and 405) in each pixel where one transistor 405 controls the current to the electroluminescent device and the other transistor 404 sits on the periphery of transistor 405 and switches

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transistor 405, thus driving transistor 405. Transistor 404 is also connected to the X-direction and Y-direction peripheral drive circuits and is thus considered a part of the drive circuit. This interpretation in light of the arrangement shown in applicant's figure 4 is applied to Tang et al. in the rejection and thus the rejection is considered proper. Further, applicant has not distinctly pointed out how the interpretation used in the rejection is incorrect.

With regards to claim 1 applicant argued that applicant's admitted prior art and Moeller et al. are not from the same field of endeavor. In response to applicant's argument, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Moeller et al. is considered in the field of applicant's endeavor as it is directed towards a semiconductor device and Moeller et al. is reasonably pertinent to the problem with which applicant was concerned, i.e. aluminum and silicon diffusing into each other when in direct contact.

Applicant also argues that there is no reason to combine. This is not persuasive as the rejection clearly states the motivation of preventing aluminum from diffusing into the silicon.

Applicant also argues that the structure of Moeller et al. is different from that of the present invention and thus even if combined would not provide the present

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invention. This is not persuasive as Moeller et al. was not relied upon for the structure of the claimed invention, but merely to provide a barrier layer between the aluminum and the silicon.

With regard to claim 9, Applicant argues that the "peripheral driving circuit" is not taught by Tang et al. This argument is not persuasive and has been discussed above with regard to claim 19, thus the rejection of claim 9 is still considered proper.

With regard to claims 10, 11 and 15-18, Applicant argues that the Office Action has failed to provide sufficient showing that one of skill in the art would have been motivated to combine the teachings of Tang and Takemura to achieve the present invention. This argument is not persuasive as the rejection of claims 10, 11 and 15-18 clearly states a motivation for combining the teachings. As stated above, one would be motivated to combine the teachings of Tang and Takemura to allow controllable selection and switching on and off of the electroluminescent devices in each pixel to display a variety of images.

Applicant also argues that claims 10 and 11 are directed towards the same invention as that of US Patent No. 6147451. Specifically, applicant argues that it is obvious that an active layer of a thin film transistor is patterned in an island form. The examiner disagrees. An active layer of a thin film transistor may be a continuous layer, or a continuous layer with isolation regions formed therein, or a thin layer lining a trench.

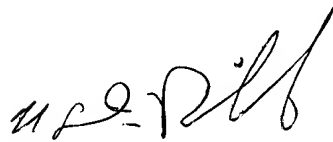
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An island is only one of a variety of configurations that may be formed by an active layer and thus it is not obvious that an active layer is patterned in an island form. Thus, claims 10 and 11 are not believed to be directed towards the same invention as that of the '451 patent.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (703) 306-5946. The examiner can normally be reached on M-F 8:00-5:30; Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



NDR

July 25, 2003



EDDIE LEE  
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